

Appl. No. 10/612,688

Amndt. dated October 14, 2005

Reply to Office Action of June 15, 2005

Amendment to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (original) A passive water management system for a fuel cell power plant (10), the system comprising:

- a. at least one fuel cell (12) for generating electrical current from hydrogen containing reducing fluid fuel and oxygen containing oxidant reactant streams, the fuel cell (12) including an anode fuel flow field (14), and a cathode oxidant flow field (16) defined adjacent opposed sides of an electrolyte (18), an anode water management flow field (20) defined adjacent the anode fuel flow field (14), the anode fuel flow field (14) (100) including at least one fuel path (102) defined between a fuel inlet (108) and a fuel outlet (110) for directing the fuel to flow adjacent to the electrolyte (18) from the fuel inlet (108) through the fuel path (102) to the fuel outlet (110);
- b. a cooler plate (52) secured in heat exchange relationship with the fuel cell (12) for removing heat from the fuel cell (12), the cooler plate (52) (118) including at least one coolant path (120) defined between a coolant inlet (126) and a coolant outlet (128) for directing a cooling fluid to flow from the

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coolant inlet (126) through the coolant path (102) to the coolant outlet (128); and,

- c. wherein a width (132) of the fuel path (102) is about the same as a width (134) of the coolant path (120) where the fuel path (102) and coolant path (120) are closest to each other, and the fuel path (102) extending between the fuel inlet (108) and the fuel outlet (110) substantially overlies the coolant path (120) extending between the coolant inlet (126) and the coolant outlet (128) to minimize a temperature differential between fuel flowing through the fuel path (102) and the closest cooling fluid flowing through the coolant path (120).

Claim 2 (original): The system of claim 1, further comprising a plurality of fuel paths (102) extending between the fuel inlet (108) and the fuel outlet (110) of about the same width as and substantially overlying a corresponding plurality of coolant paths (120) extending between the coolant inlet (126) and the coolant outlet (128).

Claim 3 (original): The system of claim 1, further comprising a coolant loop (54) for circulating a cooling fluid through the cooler plate (52), the coolant loop including a pressure control means (68) for controlling a pressure of the cooling fluid within the cooler plate (52) to be below a pressure of the reactant streams within the anode fuel flow field (14) and cathode oxidant flow field (16) of the fuel cell (12)

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Claim 4 (new): A passive water management system for a fuel cell power plant (10), the system comprising:

- a. at least one fuel cell (12) for generating electrical current from hydrogen containing reducing fluid fuel and oxygen containing oxidant reactant streams, the fuel cell (12) including an anode fuel flow field (14), and a cathode oxidant flow field (16) defined adjacent opposed sides of an electrolyte (18), an anode water management flow field (20) defined adjacent the anode fuel flow field (14), the anode fuel flow field (14) (100) including at least one fuel path (102) defined between a fuel inlet (108) and a fuel outlet (110) for directing the fuel to flow adjacent to the electrolyte (18) from the fuel inlet (109) through the fuel path (102) to the fuel outlet (110);
- b. a cooler plate (52) secured in heat exchange relationship with the fuel cell (12) for removing heat from the fuel cell (12), the cooler plate (52) (118) including at least one coolant path (120) defined between a coolant inlet (126) and a coolant outlet (128) for directing a cooling fluid to flow from the coolant inlet (126) through the coolant path (102) to the coolant outlet (128); and,
- c. the fuel path (102) and the coolant path (120) oriented with respect to each other so that there is

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an absence of an evaporation zone (98) within the anode fuel flow field (14) (100).

Claim 5 (new): A method of minimizing a temperature differential between a fuel flowing through an anode fuel path (102) of a fuel cell (12) and a cooling fluid flowing through a coolant path (120) of a cooler plate (118) secured in heat exchange relationship with the fuel cell (12), the fuel cell (12) including an anode fuel flow field (14), and a cathode oxidant flow field (16) defined adjacent opposed sides of an electrolyte (18), an anode water management flow field (20) defined adjacent the anode fuel flow field (14), the anode fuel flow field (14) (100) including the fuel path (102) defined between a fuel inlet (108) and a fuel outlet (110) for directing the fuel to flow adjacent to the electrolyte (18) from the fuel inlet (108) through the fuel path (102) to the fuel outlet (110), the cooler plate (118) including the coolant path (120) defined between a coolant inlet (126) and a coolant outlet (128) for directing a cooling fluid to flow from the coolant inlet (126) through the coolant path (102) to the coolant outlet (128), the method comprising the steps of:

- a. defining a width (132) of the fuel path (102) to be about the same as a width (134) of the coolant path (120) where the fuel path (102) and the coolant path (120) are closest to each other; and,
- b. securing the cooler plate (118) to the fuel cell (12) so that the fuel path (102) extending between the fuel

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inlet (108) and the fuel outlet (110) substantially overlies the coolant path (120) extending between the coolant inlet (126) and the coolant outlet (128).